

**SCHEMATIC
DIAGRAM**

CRUMAR[®]

Musical Instruments

mod.

915



¹
K 2.1

FEMALE CONNECTOR SYMBOL (es. K2.1)



PLUG IN CONNECTOR SYMBOL



OUTPUT SIGNAL (TO DWG...)



INPUT SIGNAL (FROM DWG...)



TEST POINT (TP...)



CONNECTING POINT (ON p.c.b.)

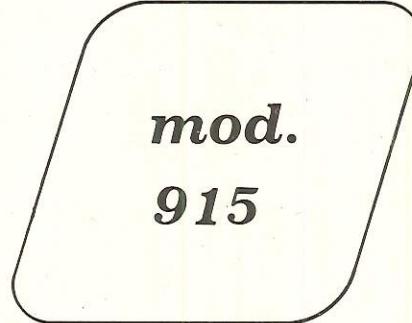
ALL resistors 1/4 unless otherwise indicated

ALL tabsswitches shown in OFF position

ALL keyswitches shown in OFF position

See part list for component part numbers

SCHEMATIC DIAGRAM

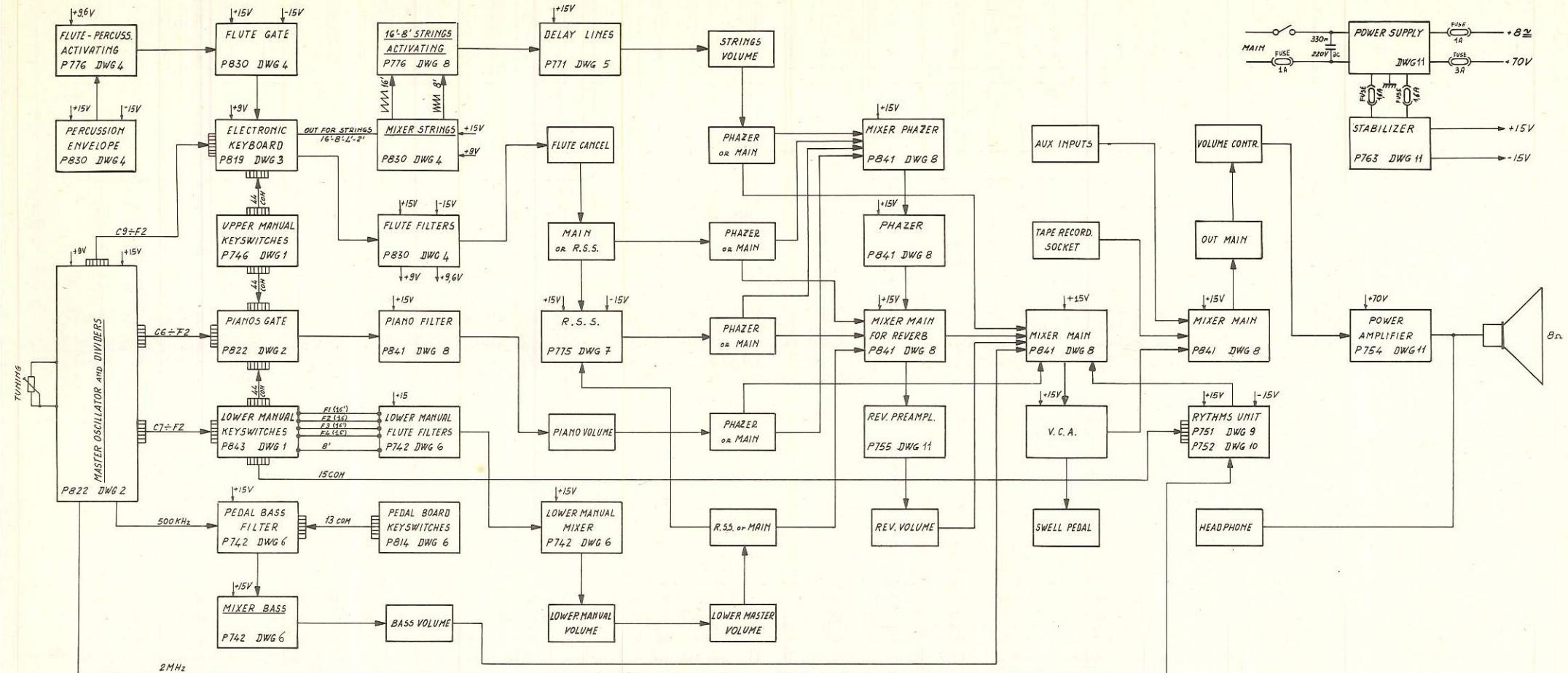


mod.
915

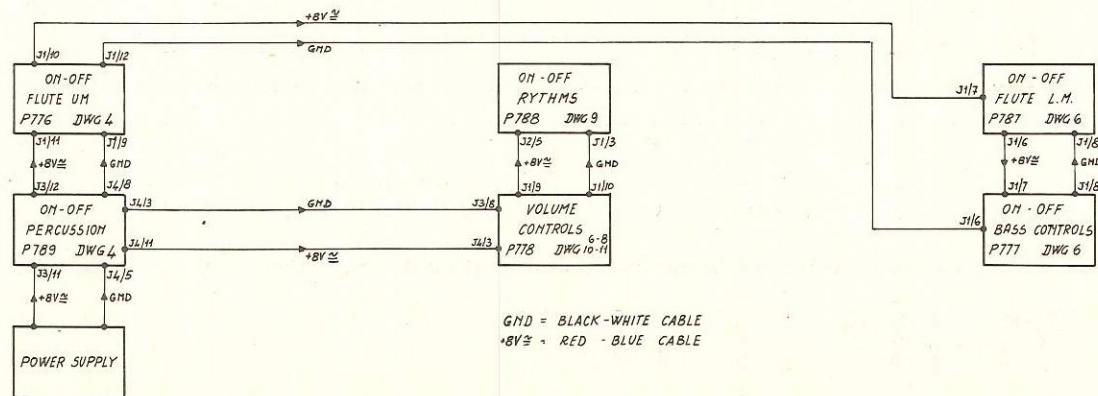
INDEX

DWG 1 (P-843)	= LOWER MANUAL KEYING CIRCUIT	DWG 8 (P-776)	= FLUTES STRINGS PIANOS CONTROLS
DWG 1 (P-746)	= UPPER MANUAL KEYING CIRCUIT	DWG 9 (P-751)	= ACCOMPANIMENT SECTION (LOGIC)
DWG 2 (P-822)	= MASTER OSCILLATOR AND DIVIDERS	DWG 9 (P-757)	= PRESS-BUTTON ASSEMBLY FOR RHYTHMS ON ACCOMPANIMENT SECTION
DWG 3 (P-818)	= MODULES FOR ELECTRONIC KEYBOARD	DWG 9 (P-788)	= PRESS-BUTTON ASSEMBLY FOR CONTROLS ON ACCOMPANIMENT SECTION
DWG 3 (P-819)	= ELECTRONIC KEYBOARD	DWG 9 (P-761)	= VOL. REVERB. - VOL. VIB. CHORUS - VOL. TEMPO RHYTHMS - VOL. PIANO BASS
DWG 4 (P-776)	= FLUTE-PERCussion ACTIVATING	DWG 10 (P-752)	= ACCOMPANIMENT SECTION (NOISES)
DWG 4 (P-830)	= FLUTE FILTER - MIXER STRINGS AND PERC. ENVELOPE	DWG 10 (P-761)	= VOL. REVERB - VOL. VIB. CHORUS - VOL. TEMPO RHYTHMS - VOL. PIANO BASS
DWG 4 (P-789)	= SUSTAIN PHASER PERCUSSION CONTROLS	DWG 10 (P-842)	= VOLUME CONTROLS
DWG 5 (P-771)	= DELAY LINES	DWG 10 (P-788)	= PRESS-BUTTON ASSEMBLY - FOR CONTROLS ON ACCOMPANIMENT SECTION
DWG 5 (P-790)	= DELAY LINES	DWG 11 (P-753)	= POWER SUPPLY FILTERS
DWG 6 (P-742)	= PEDAL BASS FILTER AND LOWER MANUAL MIXER	DWG 11 (P-754)	= AMPLIFIER
DWG 6 (P-814)	= PEDAL-BOARD KEYSWITCHES	DWG 11 (P-755)	= REVERB
DWG 6 (P-777)	= BASS CONTROLS	DWG 11 (P-763)	= POWER SUPPLY
DWG 6 (P-841)	= VOLUME CONTROLS		
DWG 6 (P-787)	= LOWER MANUAL FLUTE CONTROLS		
DWG 7 (P-775)	= ROTATING SOUND SISTEM		
DWG 8 (P-841)	= PHASER-MIXER AND FINAL PRE-AMPLIFIERS		

BLOCK DIAGRAM

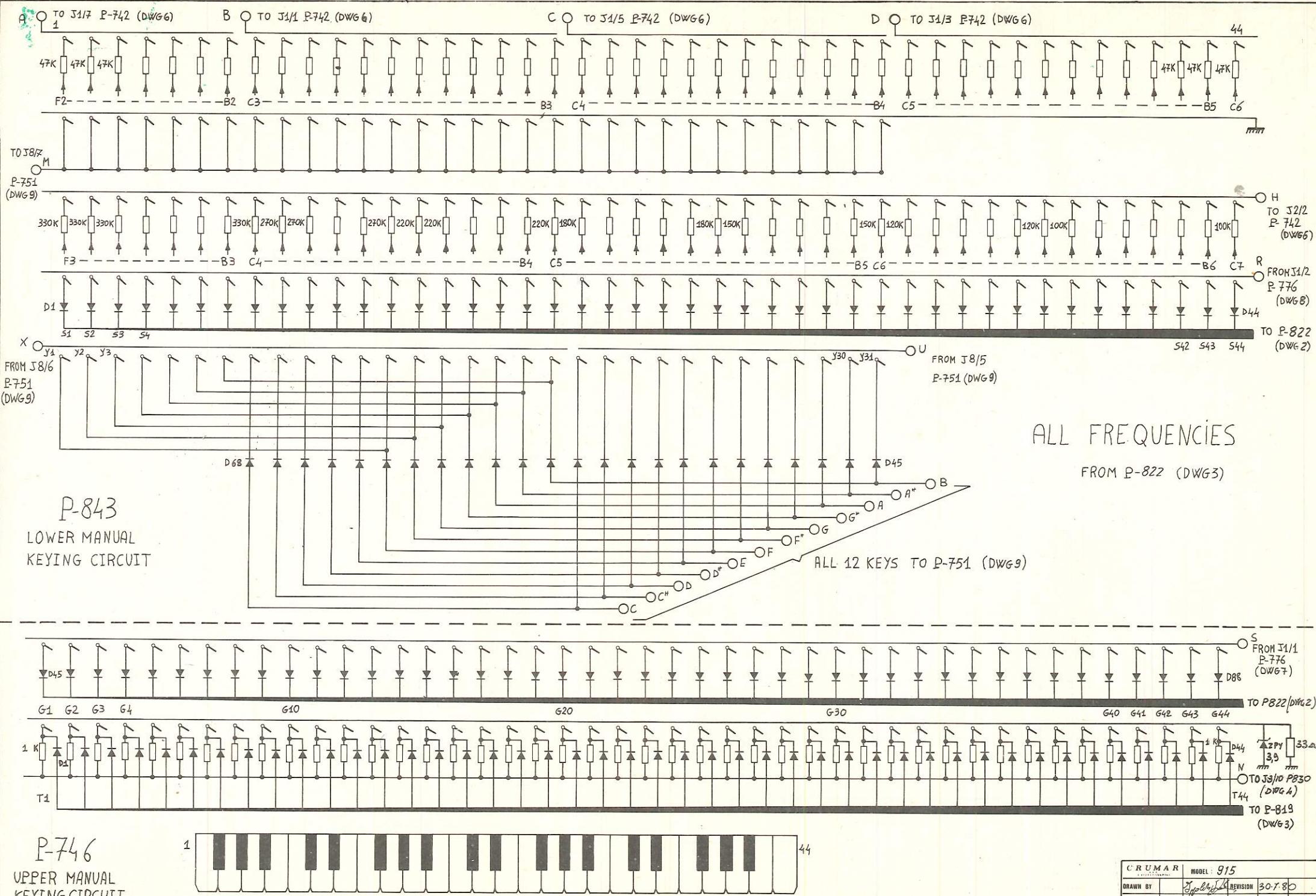


BLOCK DIAGRAM FOR LED SECTION

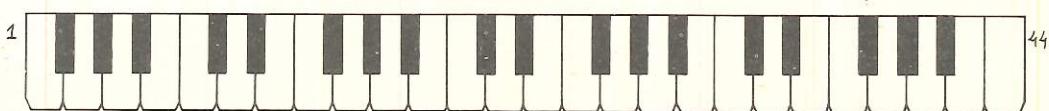


C.R.U.M.A.R.		MODEL: 915
DRAWN BY	Bordoni G.	REVISION 30-7-80
DESIGNED BY		DATE

QUESTO DISEGNO È PROPRIETÀ PRIVATA E NON PUÒ ESSERE COPIATO RIPRODOTTO
MOSTRATO A TERZI SENZA NOSTRA APPROVAZIONE SCRITTA



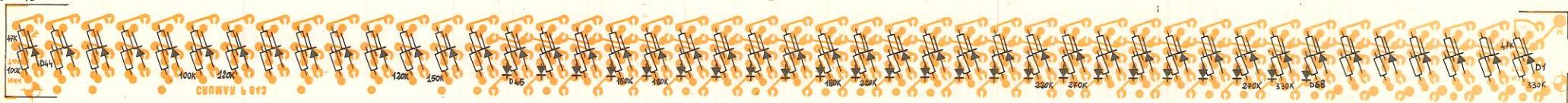
UPPER MANUAL KEYING CIRCUIT



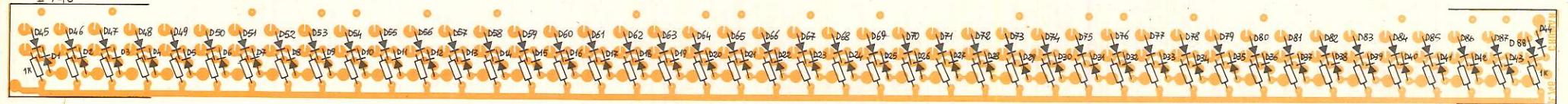
44

CRUMAR MODEL : 915
 DRAWN BY *J. Goldsmith* REVISION 30-7-80
 DESIGNED BY : DATE :

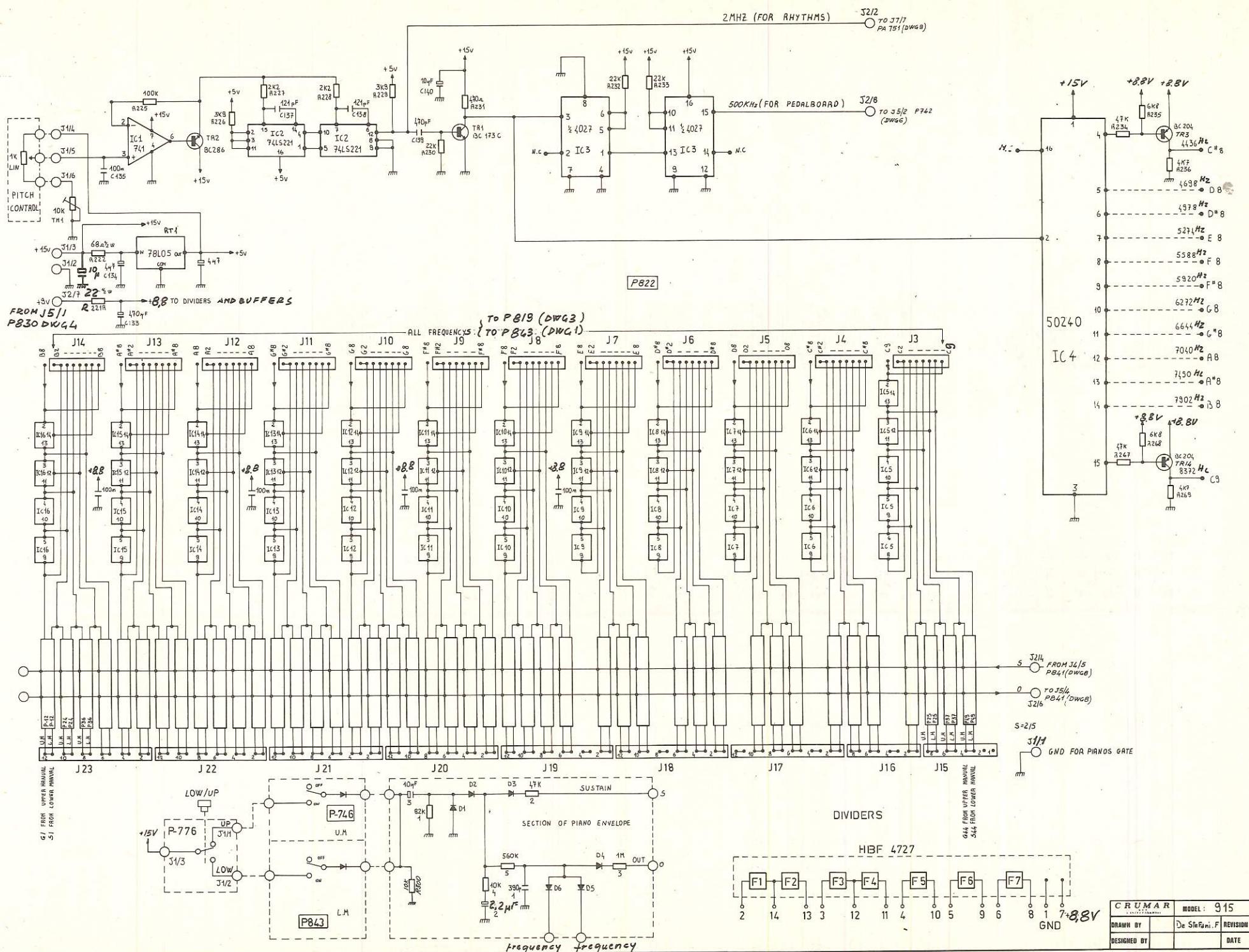
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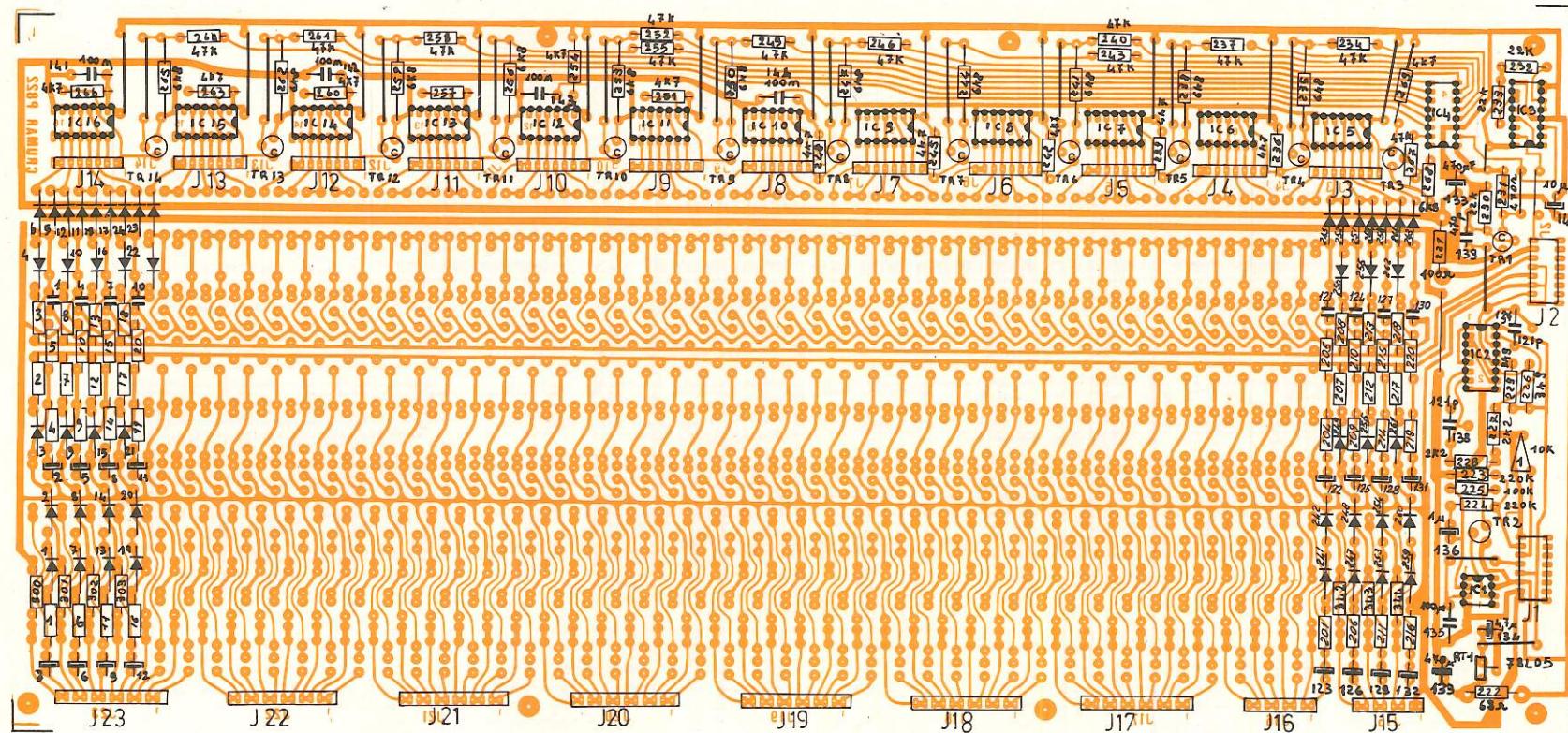
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CRUMAR		MODEL: 915
DRAWN BY	J. G. L.	REVISION 30-F 80
DESIGNED BY	J. G. L.	DATE



P.822

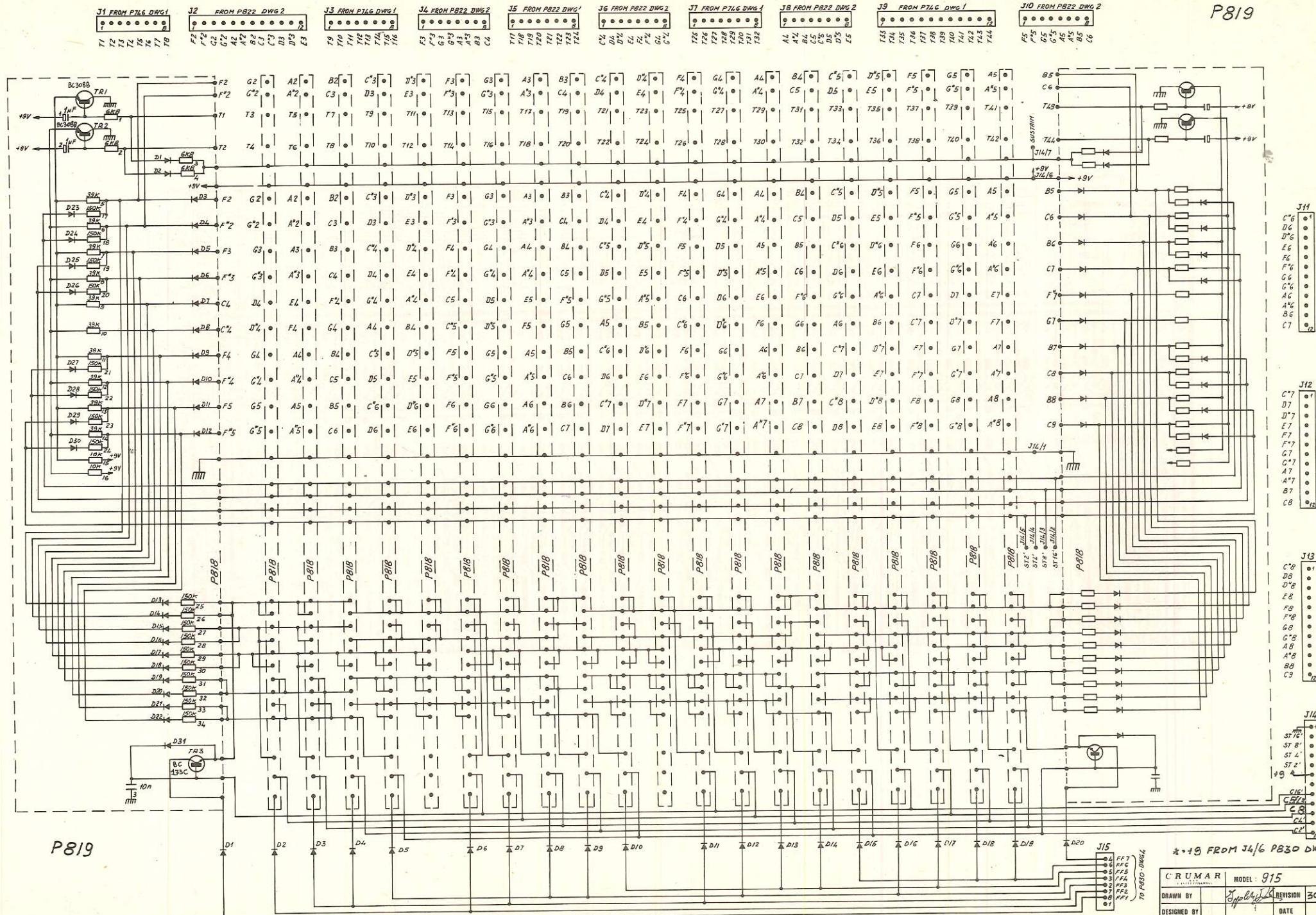


CRUMAR		MODEL: 915
DRAWN BY	Signed	REVISION
DESIGNED BY	Signed	DATE

DWG 2A

QUESTO DISGNA E PROPRIETÀ PRIVATA E NON PUÒ ESSERE COPIATO RIPRODOTTO
MOSTRATO A TERZI SENZA NOSTRA APPROVAZIONE SCRITTA.

P819

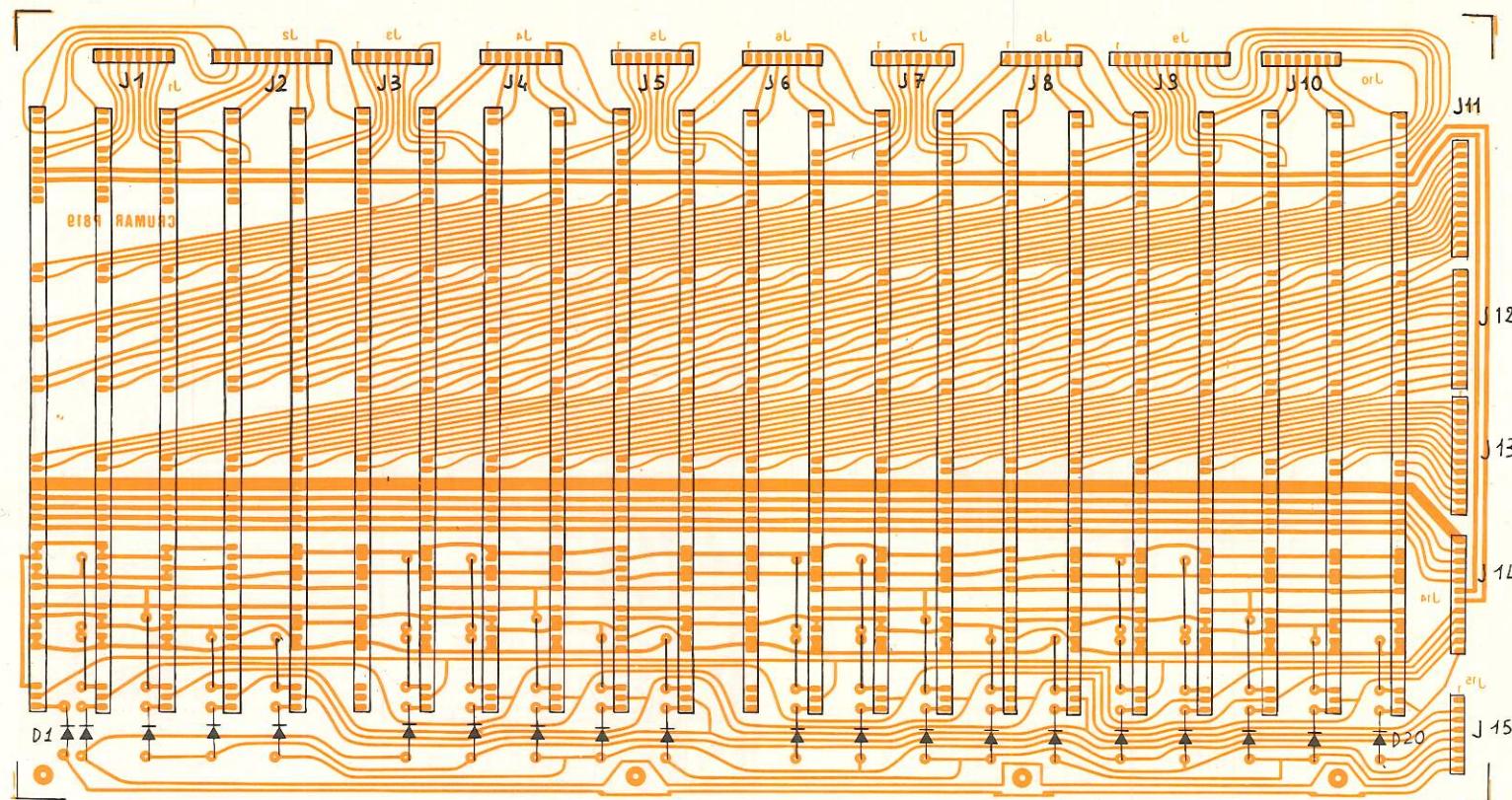


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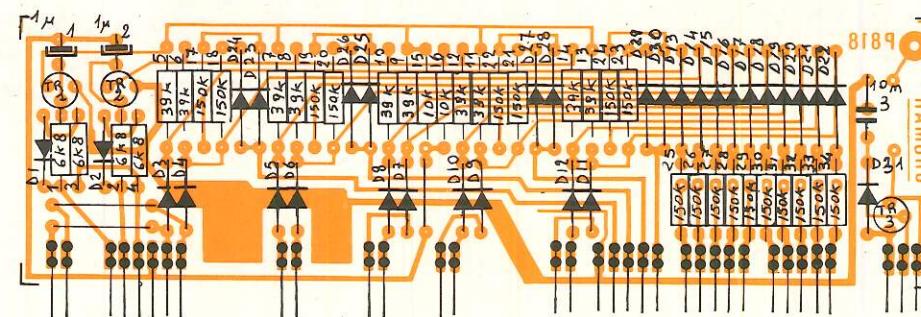
*-19 FROM 34/6 PB30 DIG 4

C R U M A R <small>AN INSTRUMENT COMPANY</small>	MODEL : 915		
DRAWN BY	<i>J. P. Kelly Jr.</i>	REVISION	30-7-8
DESIGNED BY	:	DATE	

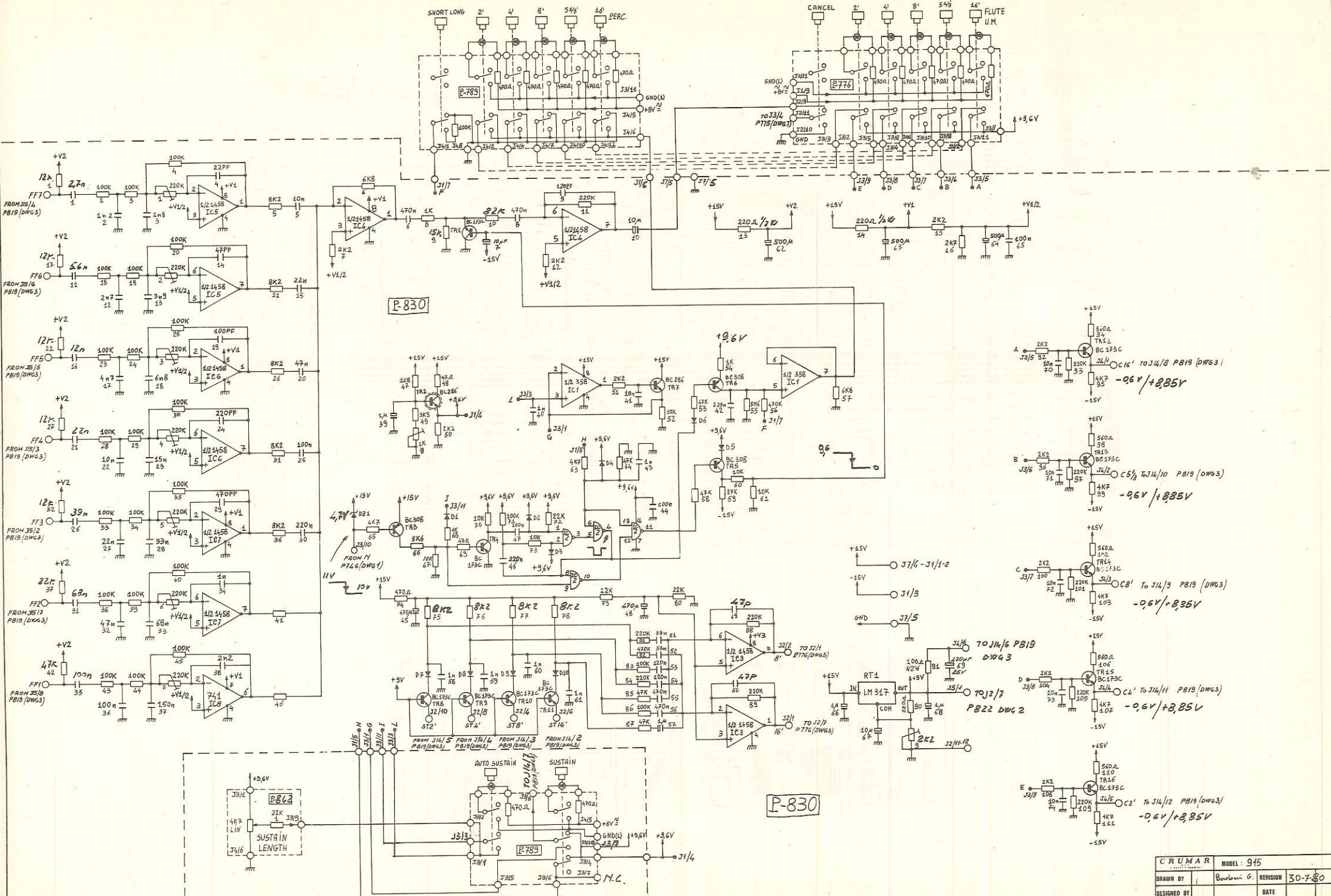
P-819



P-8 | 8

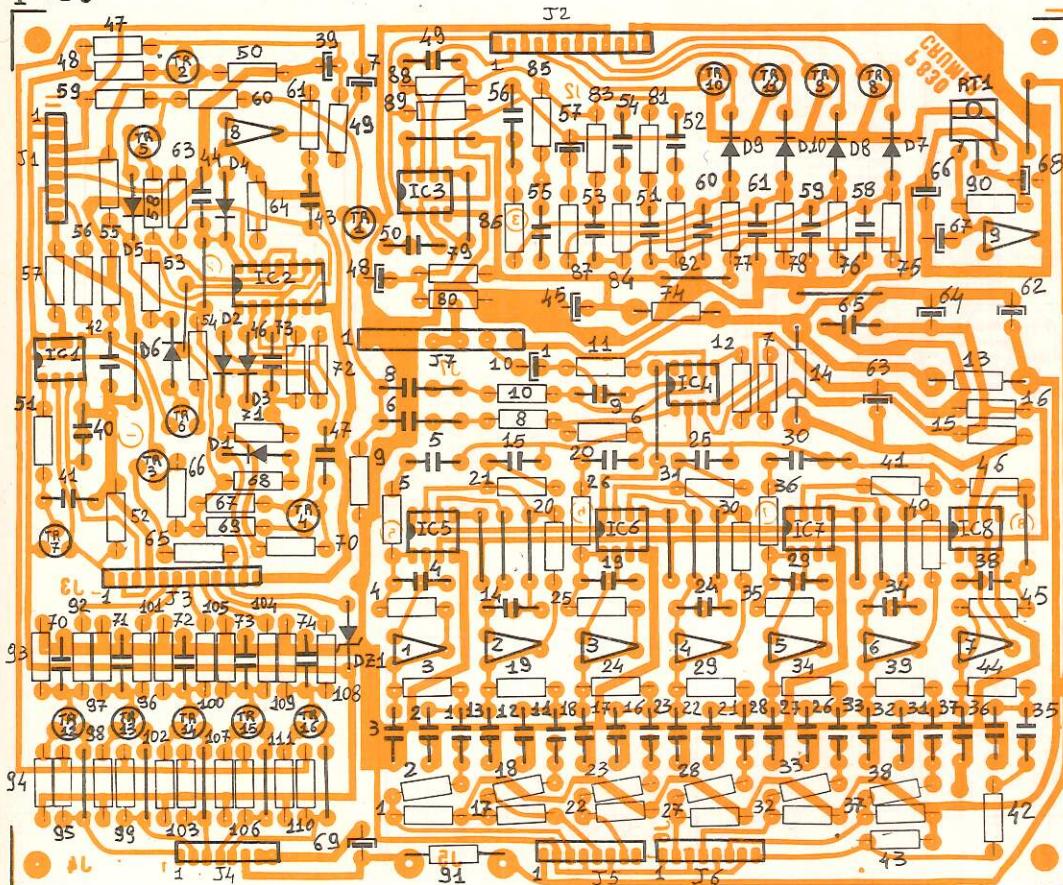


CRUMAR	MODEL : 915		
DRAWN BY	<i>J. P. Bell</i>	REVISION	30-7-80
DESIGNED BY		DATE	

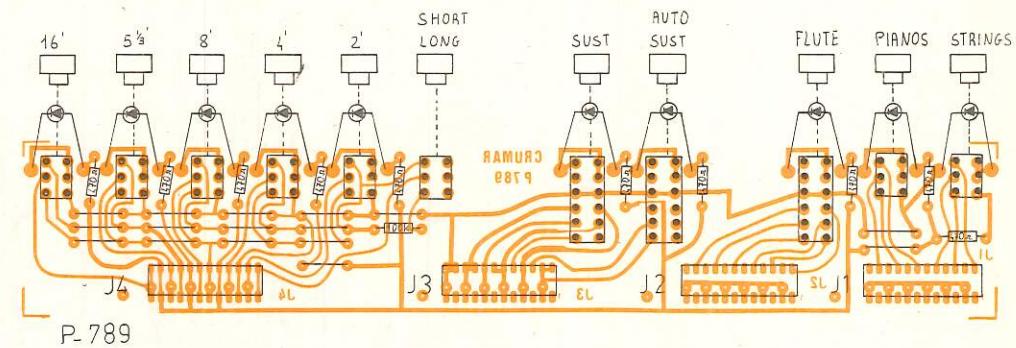


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DRAWN BY	Borlawn G.	REVISION	30-7-80
DESIGNED BY		DATE	

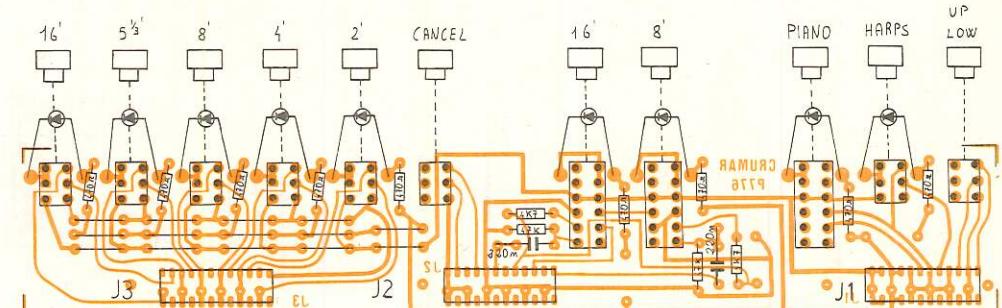
P-830



PERCUSSION

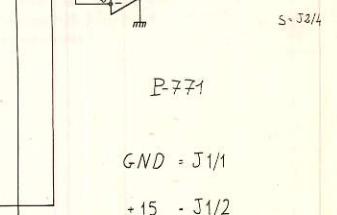
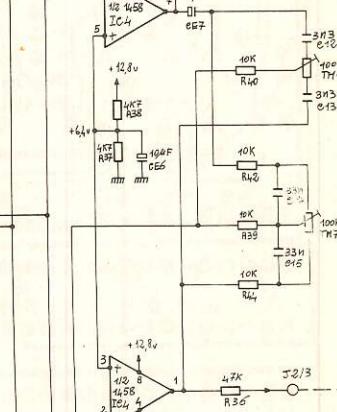
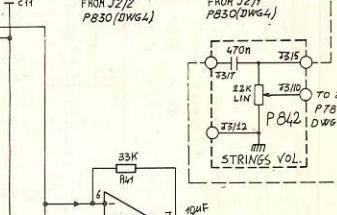
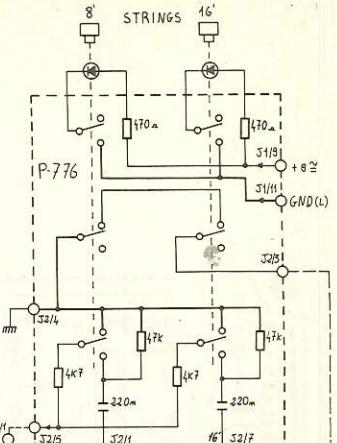
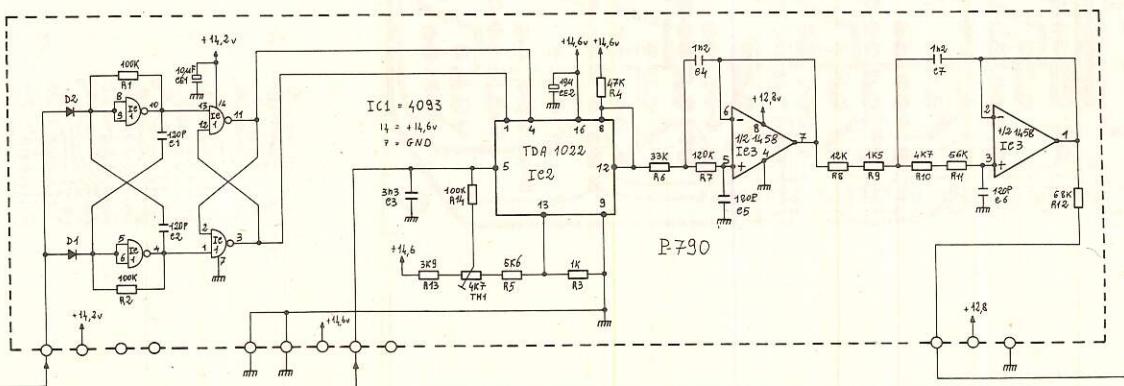
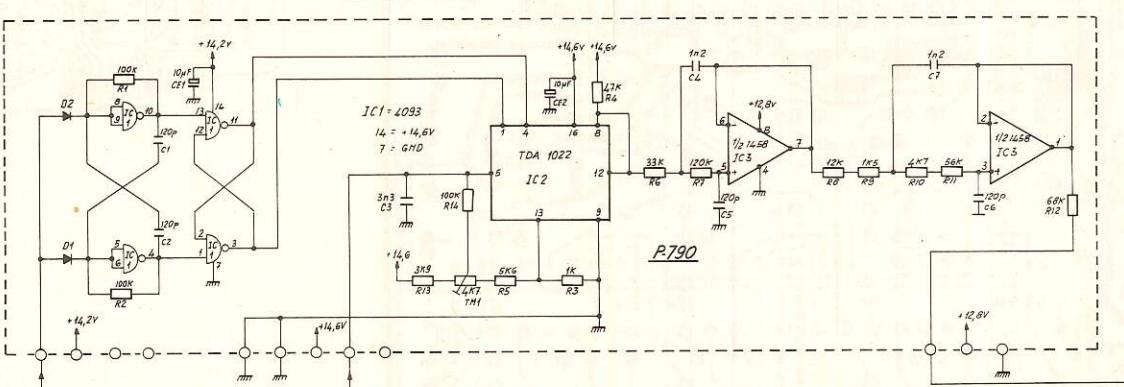
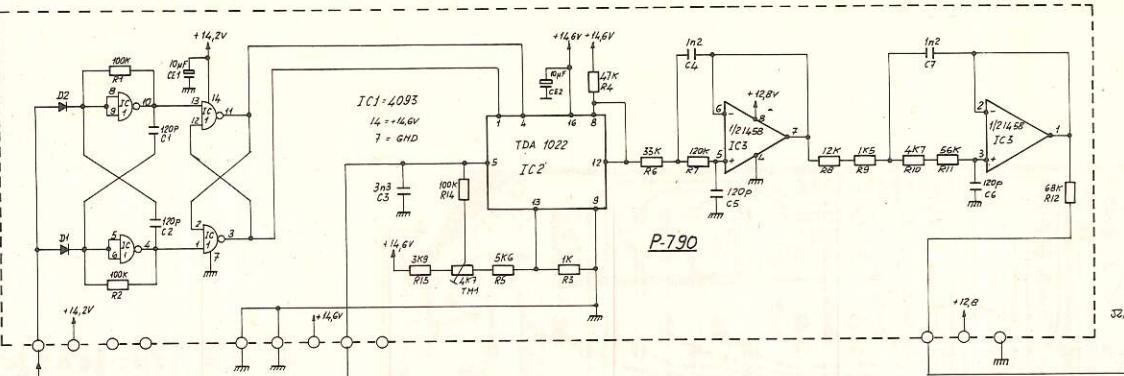
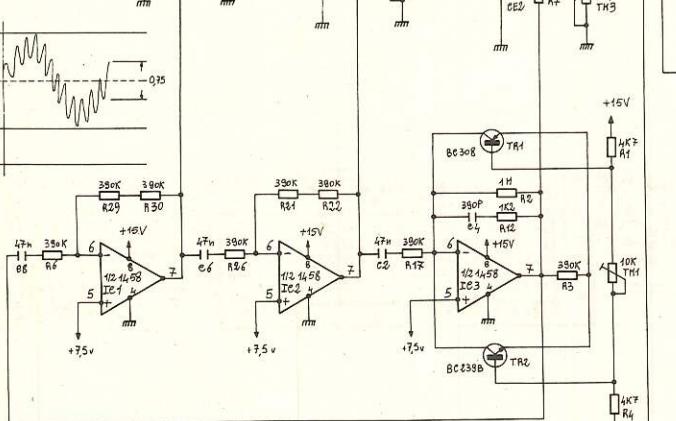
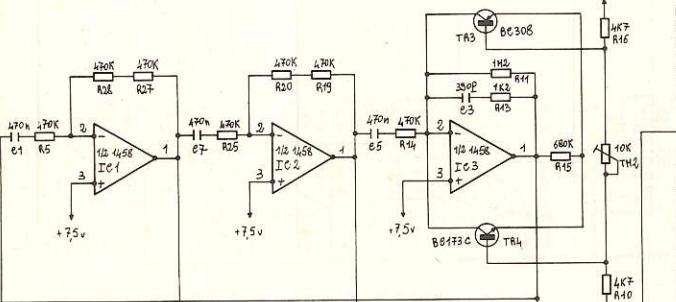
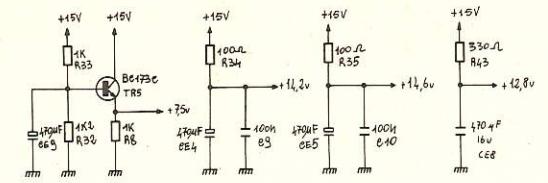


FLUTES



P-776

C R U M A R	MODEL: 915		
DRAWN BY	<i>Zygmunt Jaskiewicz</i>	REVISION	30-7-80
DESIGNED BY	:	DATE	



GND = J1/1

+ 15 - J1/2

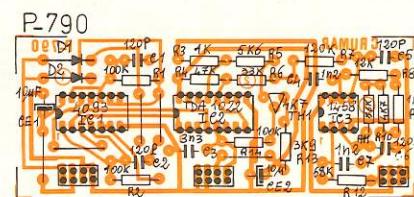
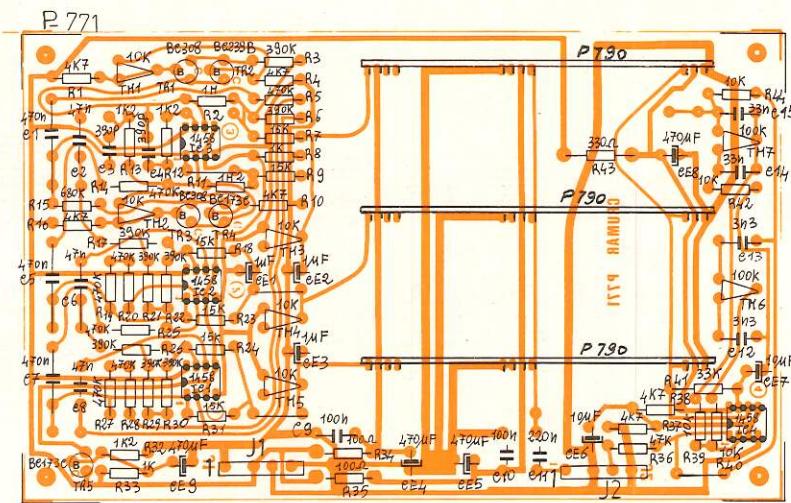
C.RUMAR	MODEL: 915
DRAWN BY	Z. Polak
DESIGNED BY	

REVISION 30.7.80

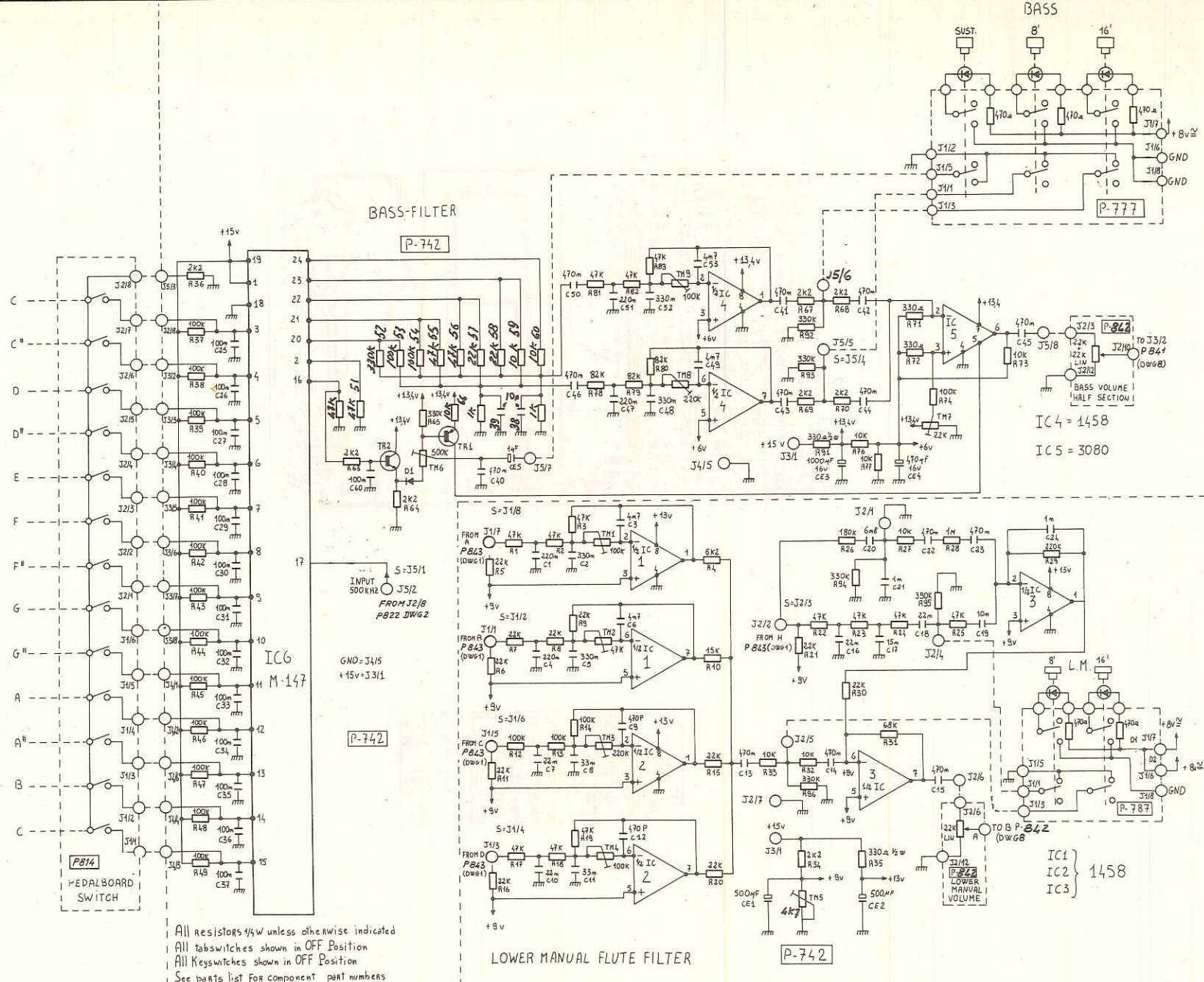
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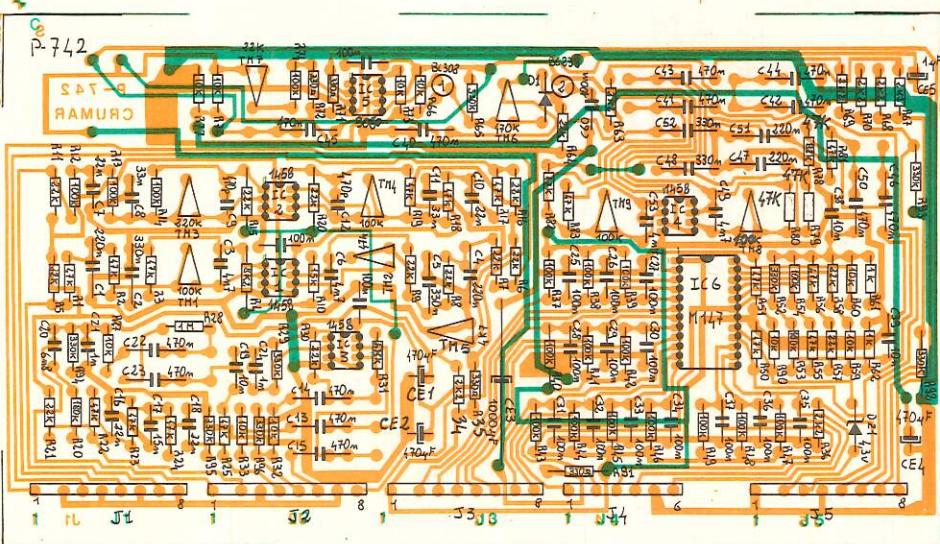
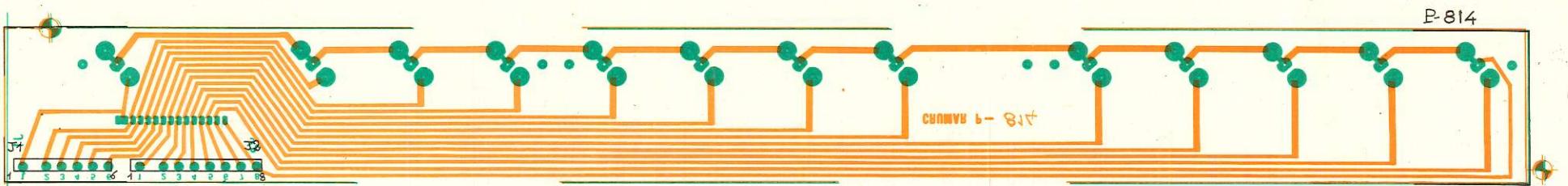
DWG 5

QUESTO DISEGNO E' PROPRIETÀ PRIVATA E NON PUÒ ESSERE COPIATO RIPRODOTTO O MOSTRATO A TERZI SENZA NOSTRA APPROVAZIONE SCRITTA

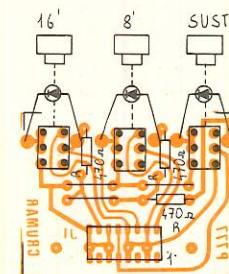


CRUMAR		MODEL: 915
DRAWN BY	Signed	REVISION
DESIGNED BY	Signed	DATE



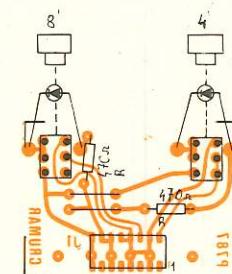


BASS



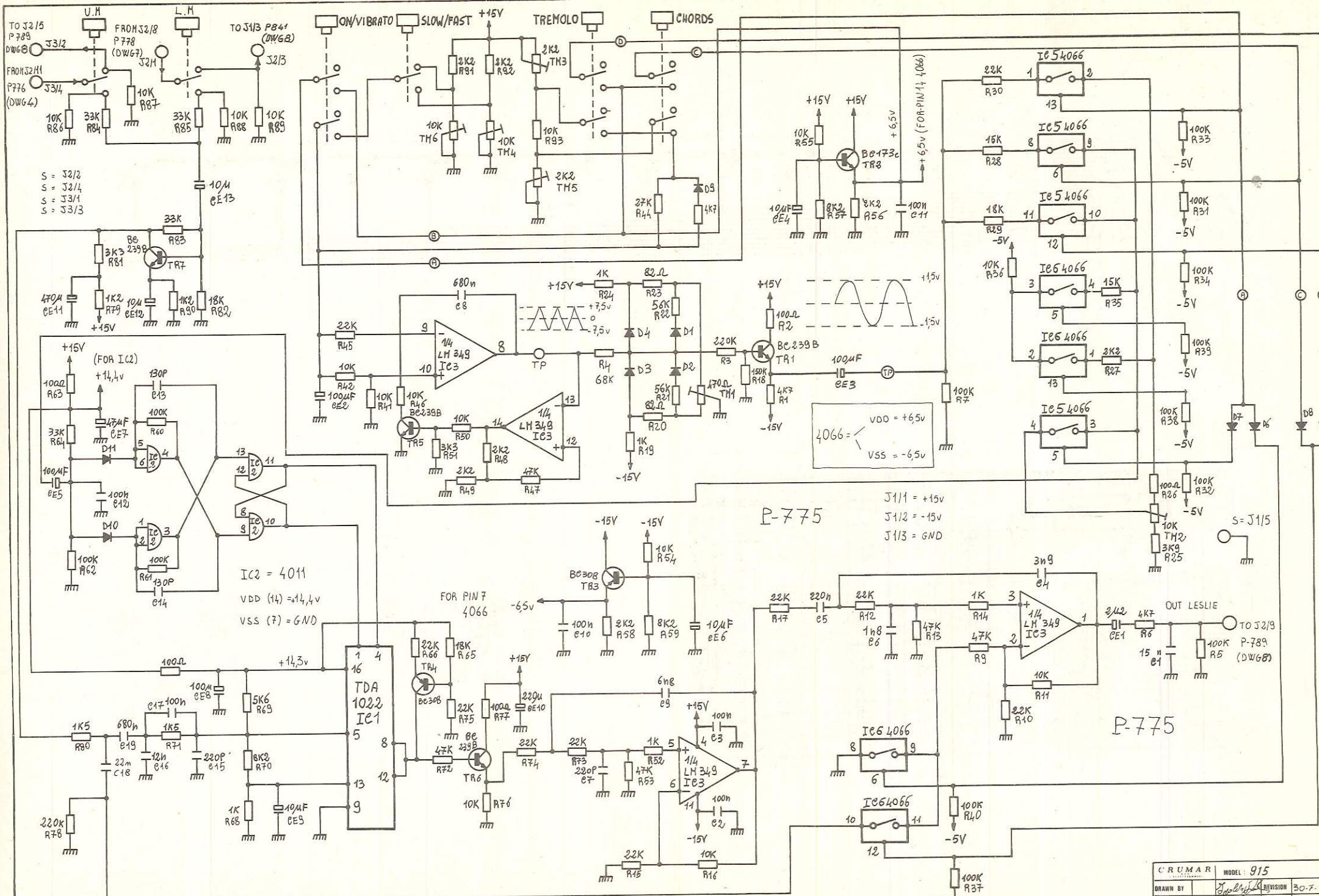
P-777

FLUTES

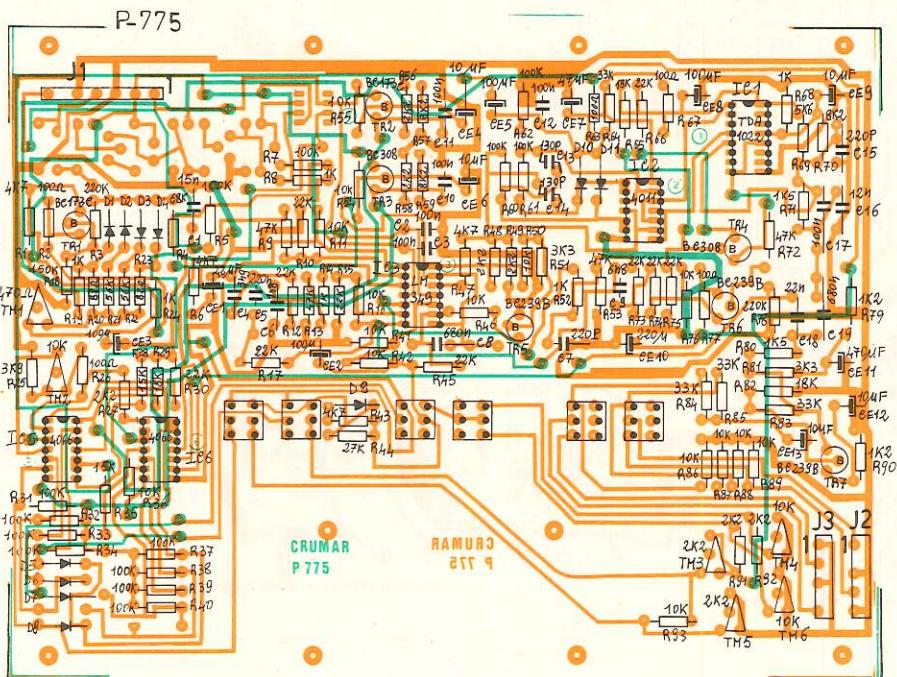


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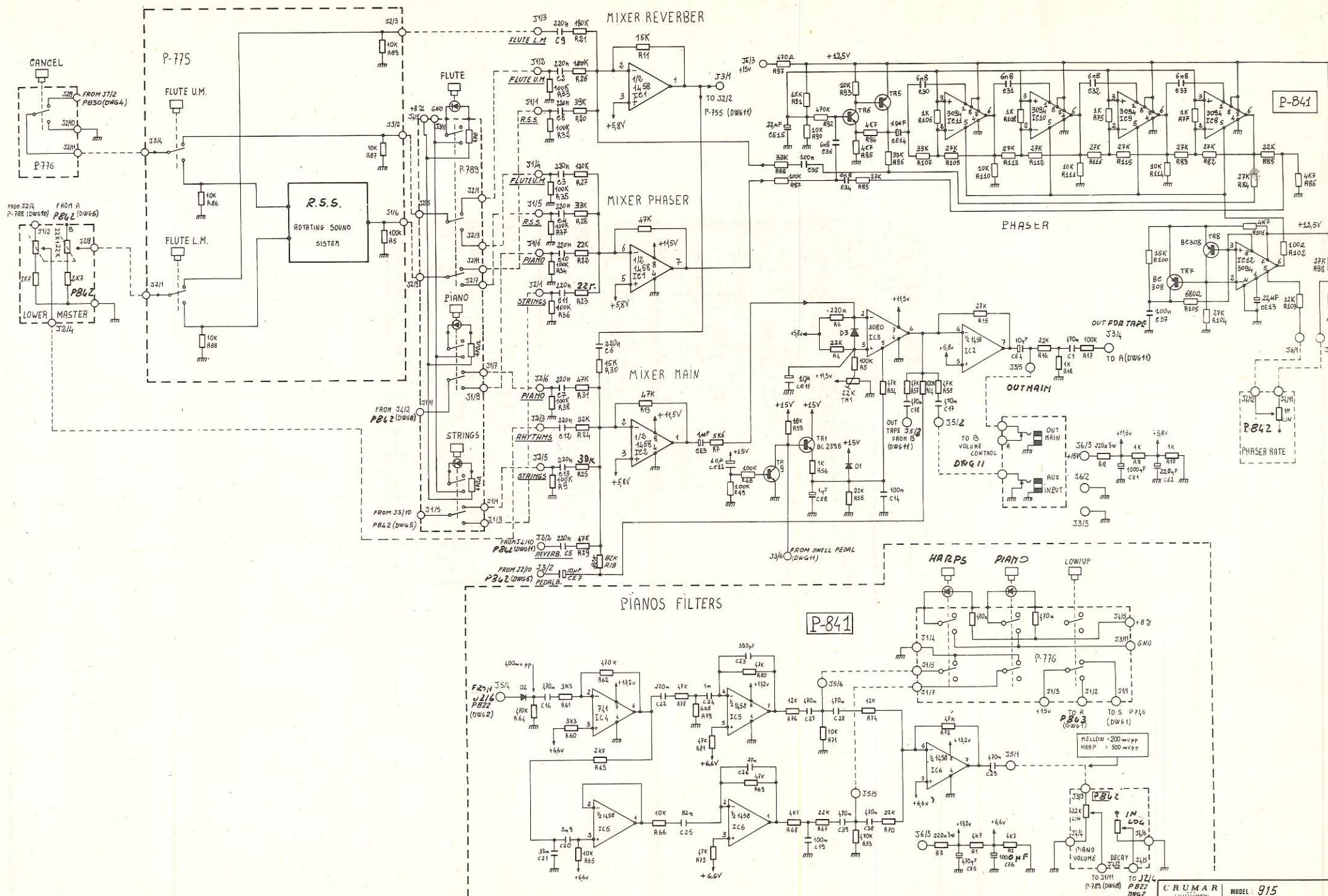
CRUMAR		MODEL: 915
DRAWN BY	Signed	REVISION 30-7-82
DESIGNED BY	Signed	DATE



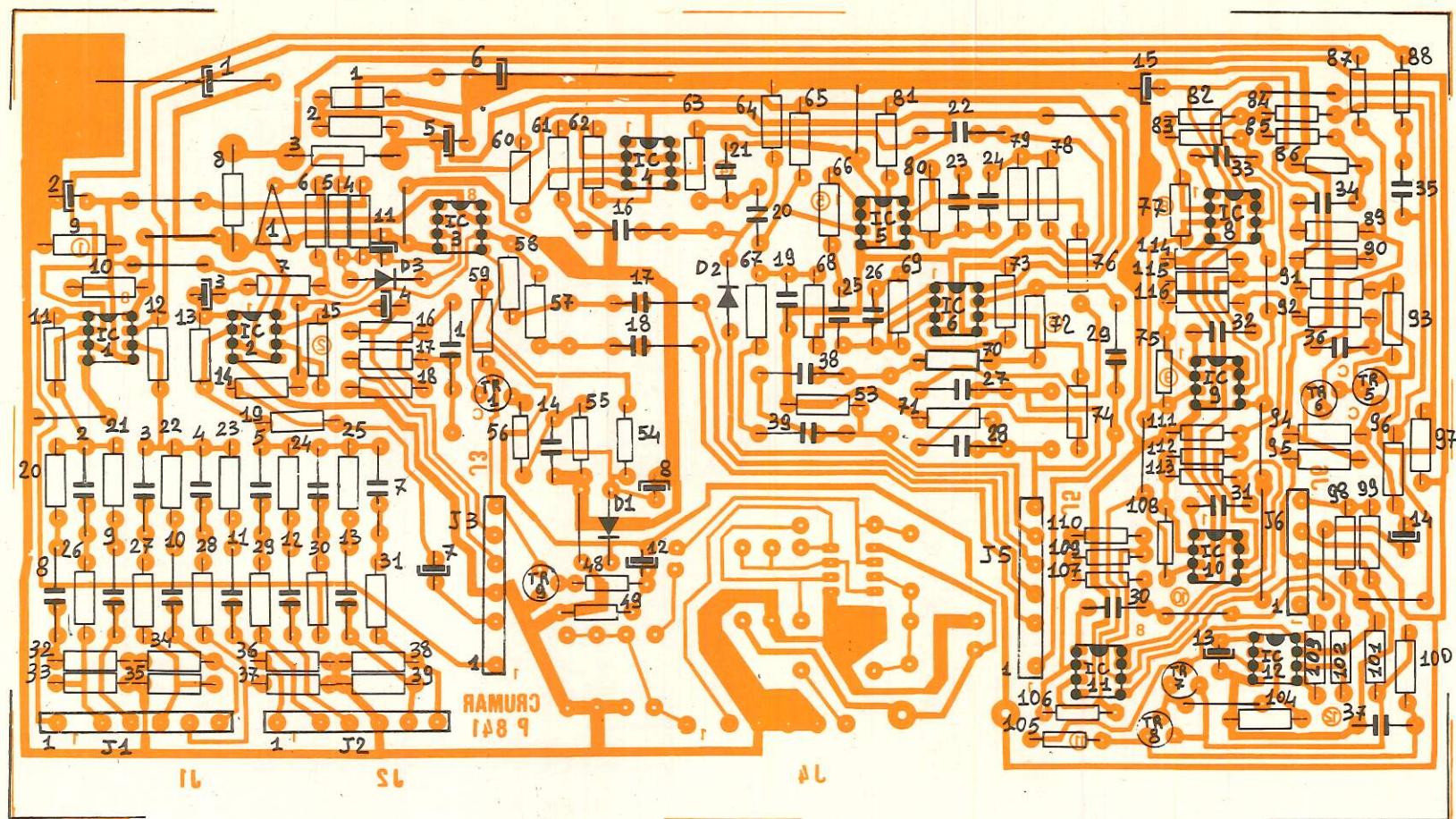
CRUMAR		MODEL: 915	
DRAWN BY	<i>J. P. L.</i>	REVISION	30-7-80
DESIGNED BY		DATE	



CRUMAR		MODEL: 915
DRAWN BY	Signed	REVISION
DESIGNED BY	Signed	DATE



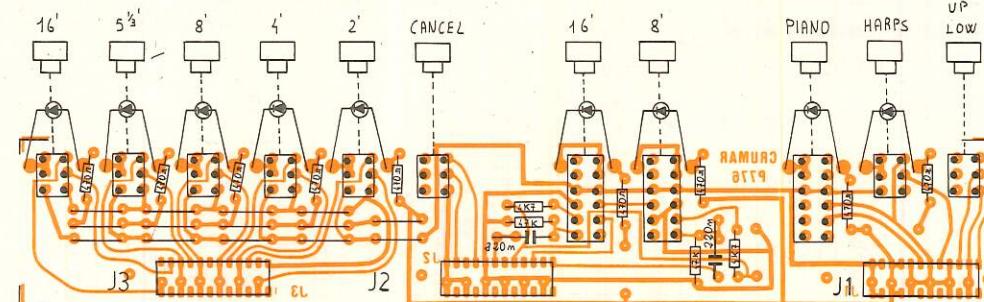
P-841



FLUTES

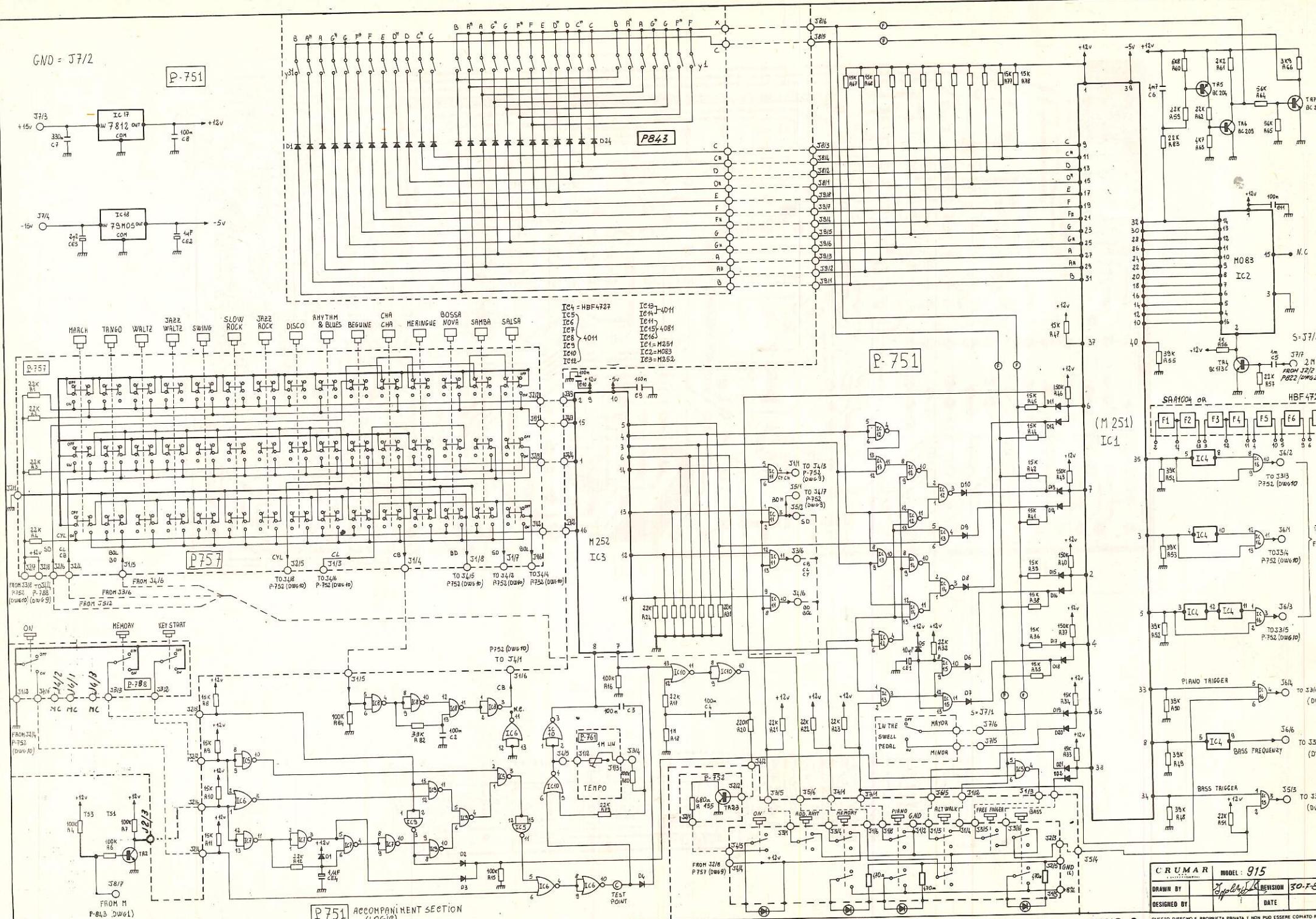
STRINGS

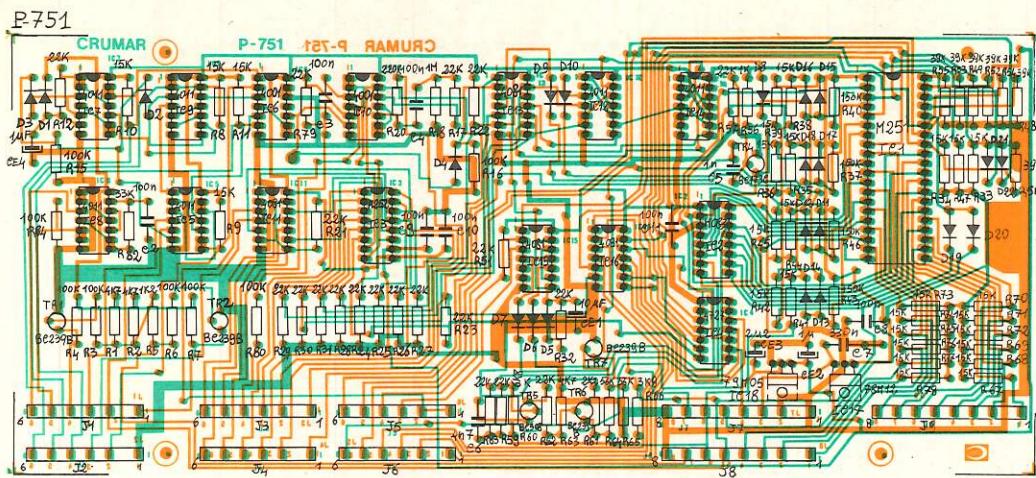
PIANOS



P-776

CRUMAR		MODEL: 915
DRAWN BY	<i>J. Goldsmith</i>	REVISION
DESIGNED BY		DATE



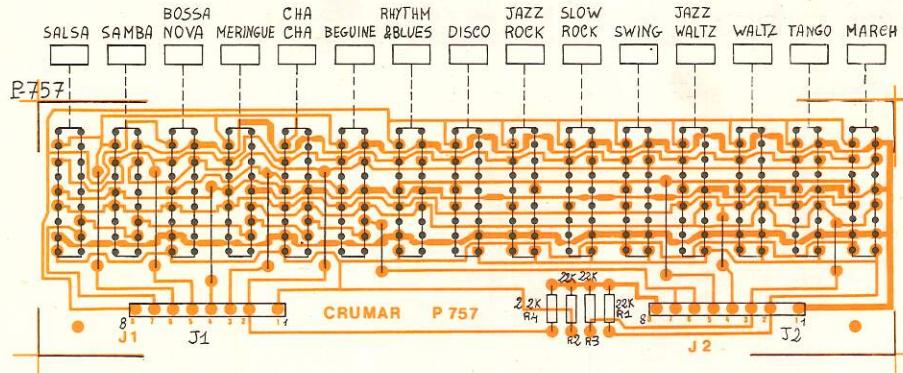


P-761

1M LIN

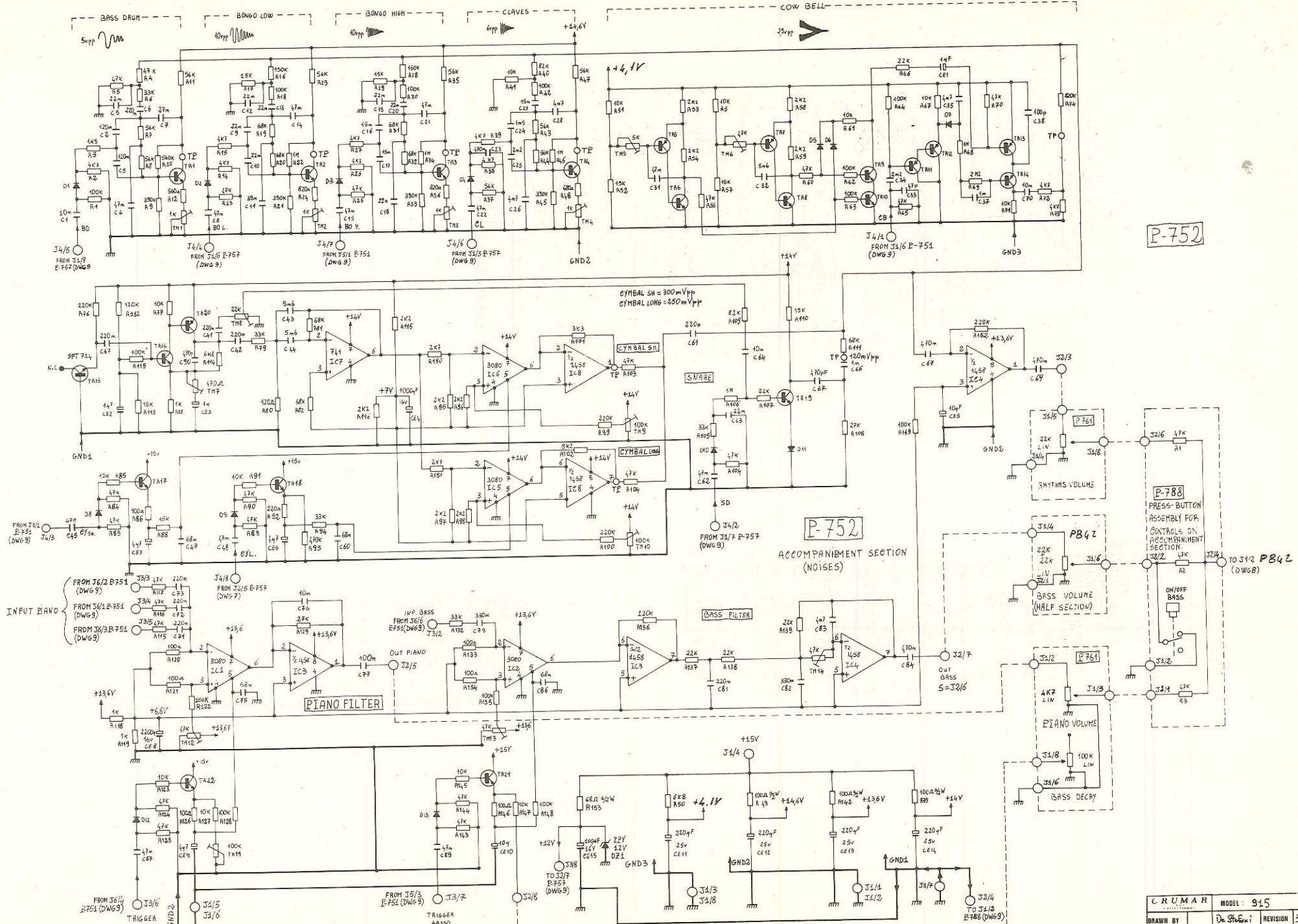
RAMURDO 181-9

TEMPO



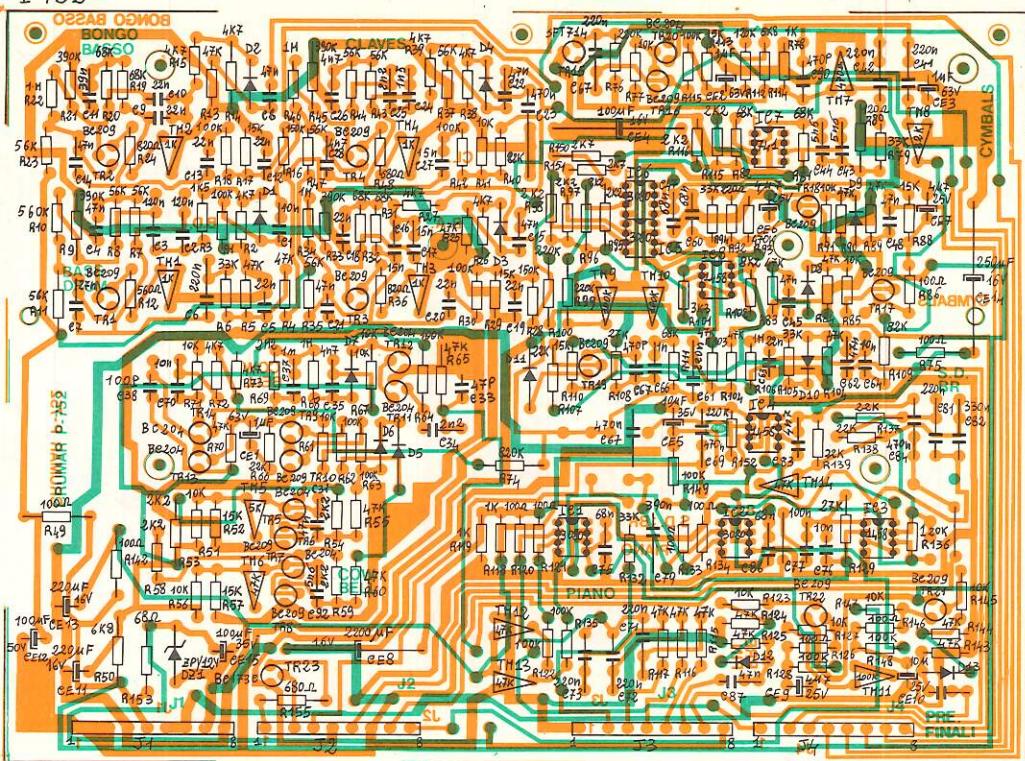
P-788

C R U M A R Engineering	MODEL: 915		
DRAWN BY	<i>J. P. Clegg</i>	REVISION	30-7-80
DESIGNED BY	:	DATE	

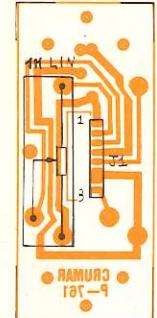


CRUMAR		MODEL: 915
DRAWN BY	De Stefani	REVISION
DESIGNED BY	Bonelli	DATE

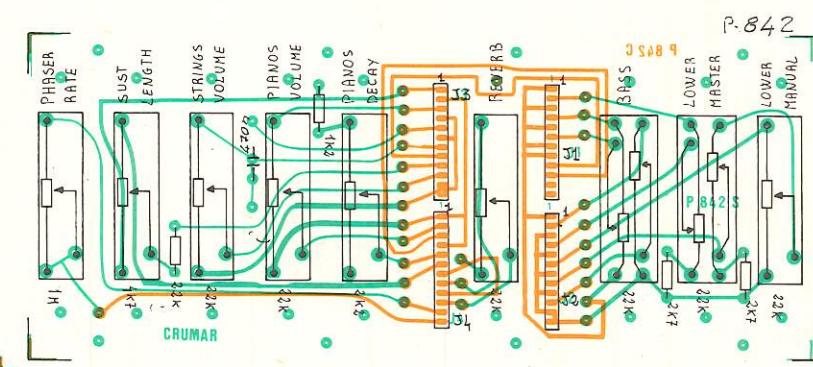
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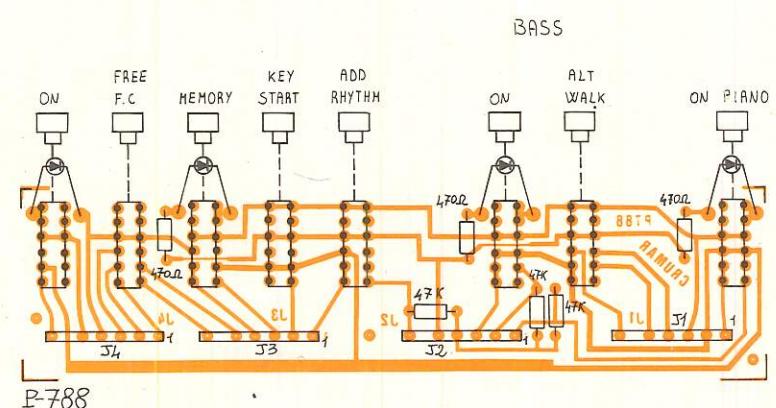
P-761



TEMPO

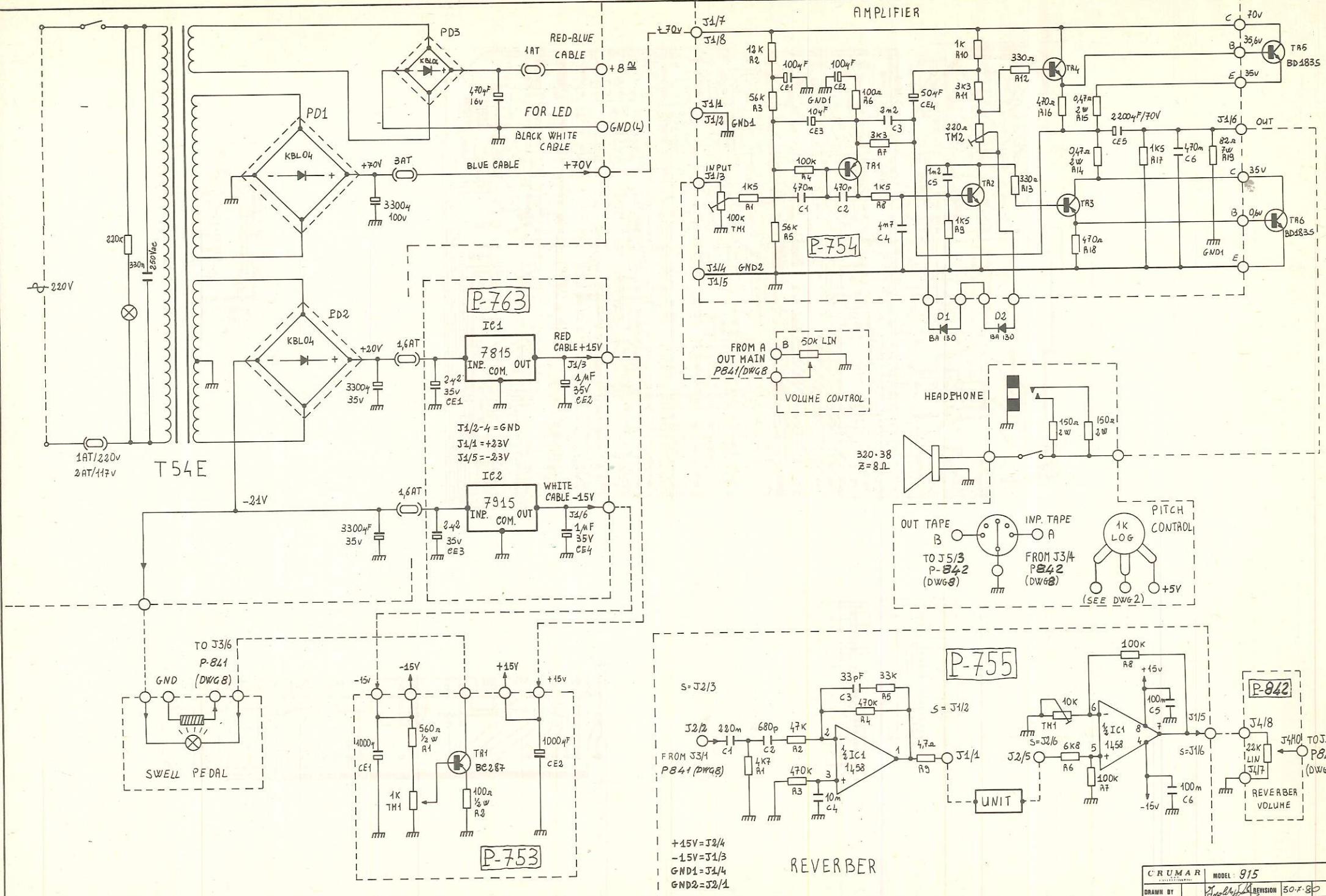


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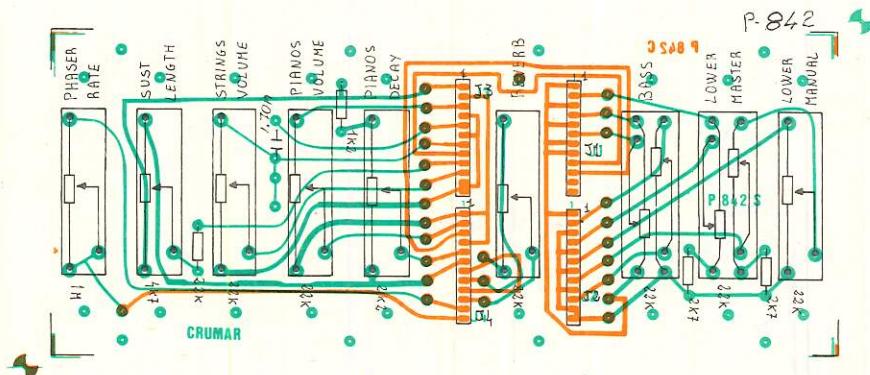
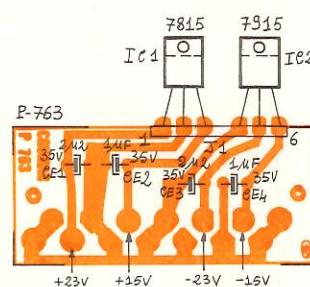
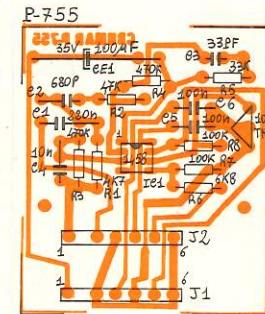
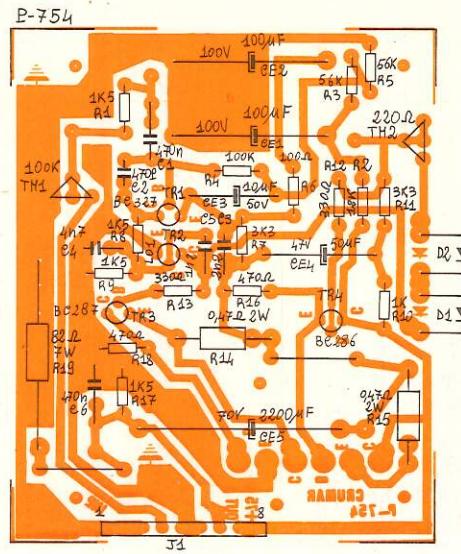
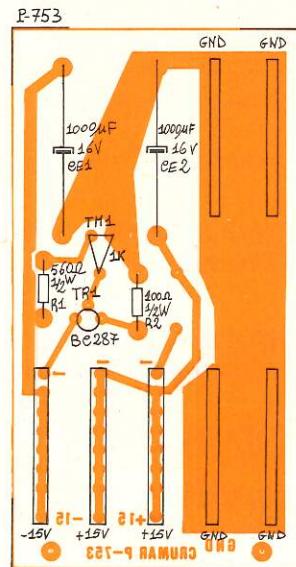


P-788

CRUMAR		MODEL: 915
DRAWN BY	J. P. L.	REVISION 30-F80
DESIGNED BY		DATE



CRUMAR	MODEL: 915		
DRAWN BY	<i>J. G. B. L.</i>	REVISION	30-F-80
DESIGNED BY		DATE	



CRUMAR		MODEL: 915	
DRAWN BY	J. P. M.	REVISION	30-780
DESIGNED BY		DATE	

MODEL 915

ELECTRONIC COMPONENT LIST

Schem. Ref.	Circuit	Type	Part Code
P-843 D1 ÷ D68	L.M. KEYING CIRCUIT (DWG1) Complete with Components Diodes	BA130	978002437 65000001
P-746 D1 ÷ D88	U.M. KEYING CIRCUIT (DWG1) Complete with Components Diodes	BA130	978002435 65000001
P-822 IC1 IC2 IC3	MASTER OSCILLATORS AND DIVIDERS (DWG2) Complete with Components Voltage reference Master Oscillator Dual J-K Master Slave Flip-Flop with 4027 Set and Reset	741 7LLS221	978002413 68000059 68000058
IC4 IC5 ÷ IC16 TR1 TR2 TR3 ÷ TR14 RT1 D1 ÷ D264	T.O.S. Divider Buffer Voltage Reference Buffer Voltage Regulator Diodes	MK50240 HBF4727 BC173C BC286 BC308B 78L05 1N4149	68000009 68000041 62120003 62110002 62210001 62000031 65000007
P-818 TR1 - TR2 TR3 D1 ÷ D31	MODULES FOR ELECTRONIC KEYBOARD (DWG3) Complete with Components Gate Preamplifier Diodes	BC308B BC173C 1N4149	978002409 62210001 62120003 65000007
P-819 D1 ÷ D20	ELECTRONIC KEYBOARD (DWG3) Complete with Components Diodes		978002410 65000001
P-776	FLUTE-PERCUSION ACTIVATING (DWG4) Complete with Components		978002355
P-830 IC1	FLUTE FILTER - MIXER STRINGS AND PERC. ENVELOPE (DWG4) Complete with Components Voltage Reference and Perc. Envelope	358	978002421 68000093

MODEL 915

ELECTRONIC COMPONENT LIST

Schem. Ref.	Circuit	Type	Part Code
IC2	Mixer	4011	68000034
IC3 ÷ IC7	Filter Preamplifier	1458	68000053
IC8	Filter Preamplifier	741	68030141
TR1 - TR4	Buffer	BC173C	62100003
TR2	Voltage Regulator	BC286	62110002
TR7	Buster Power	BC286	62110002
TR3 - TR5 - TR6	Gate	BC308	62210001
TR12 ÷ TR16	Buffer	BC173C	62100003
TR8 ÷ TR11	Preamplifier	BC173C	62100003
RT1	Voltage Regulator	LM317T	62110034
DZ1	Diode Zener	ZPY4,7V	67000002
D1 ÷ D10	Diodes	BA130	65000001
DELAY LINES (DWG5)			
Complete with Components			978002350
Oscillators			1458
Preamplifier			1458
Limiter			BC308B
Limiter			BC239B
Emitter Follower			BC173C
DELAY LINES (DWG5)			
Complete with Components			978002369
Quad 2-Input NAND Schmitt Trigger			4093
Delay-Line			TDA1022
Filters			1458
Diodes			BA130
PEDAL BASS FILTER AND LOWER MANUAL MIXER (DWG6)			
Complete with Components			978002316
Filter Preamplifier			1458 or 4558
Preamplifier			68000062
Mixer			1458 or 4558
V.C.A.			68000062
Pedal Frequency Generator			3080
Gate			M147
Gate			BC308
Diode Zener			BC173B
Diode			ZPY4,3V
			67000075
			BA130
			65000001

MODEL 915

ELECTRONIC COMPONENT LIST

Schem. Ref.	Circuit	Type	Part Code
P-814	PEDAL-BOARD KEYSWITCHES (DWG6) Complete with Components		978002397
P-777	BASS CONTROLS (DWG6) Complete with Components		978002356
P-842	VOLUME CONTROLS (DWG6) Complete with Components		978002357
P-787 D1 ÷ D2	LOWER MANUAL FLUTE CONTROLS (DWG6) Complete with Components Diodes	BA130	978002366 65000001
P-775 IC1 IC2	ROTATING SOUND SISTEM (DWG6) Complete with Components Delay Line Quad 2-Input NAND Buffered B Series Gate	TDA1022	978002354 68000084
IC3 ½ IC3 ½ IC5-IC6 TR7 TR5 TR6 TR1 ÷ TR2 TR3 TR4 D1 ÷ D11	Filters Oscillator Analog Switch Mixer Switch Emitter Follower Emitter Follower Emitter Follower Current Source Diodes	4011 LM349 LM349 4066 BC239B BC239B BC239B BC173C BC308B BC308B BA130	68000034 68030132 68030132 68000094 62120001 62120001 62120001 62100003 62210001 62210001 65000001
P-841 IC1 ÷ IC2 IC5 - IC6 IC3 IC4 IC8 ÷ IC11	PHASER-MIXER AND FINAL PRE-AMPLIFIERS (DWG8) Complete with Components Mixer Preamplifier Filter Preamplifier Modulator Preamplifier V.C.A.	1458 1458 3080 741 3094	978002434 68000053 68000053 68000066 68030141 68000098

MODEL 915

ELECTRONIC COMPONENT LIST

Schem. Ref.	Circuit	Type	Part Code
IC12	Oscillator	3094	68000098
TR1	Emitter Follower	BC173C	62120003
TR6 - TR9	Preamplifier	BC173C	62120003
TR5	Preamplifier	BC308	62210001
TR7 - TR8	Oscillator	BC308	62210001
D1 ÷ D3	Diodes	BA130	65000001
ACCOMPANIMENT SECTION (LOGIC) (DWG9)			
P-751	Complete with Components		978002324
IC1	Accompaniment Unit	M251	68000109
IC2	T.O.S.	M083	68070129
IC3	Rhythms Memory	M252	68040130
IC4	Divider	HBF4727	68000041
IC6-IC10	Quad 2-Input NOR Gate	4001	68000020
IC12-IC14	Quad 2-Input NAND Buffered Series Gate	4011	68000034
IC11-IC13	Quad 2-Input AND Buffered B Series Gate	4081	68000019
IC15-IC16	Quad 2-Input AND Buffered B Series Gate	4081	68000019
IC17	Voltage Regulator	78M12	62110027
IC18	Voltage Regulator	79M05	62110029
TR1-TR2	Switch	BC239B	62120001
TR6-TR7	Buffer Preamplifier	BC239B	62120001
TR4	Buffer	BC173C	62120003
TR5	Buffer Preamplifier	BC308B	62210001
D1 ÷ D22	Diodes	BA130	65000001
PRESS-BUTTON ASSEMBLY FOR RHYTHMS ON ACCOMP. SECTION (DWG9)			
P-757	Complete with Components		978002330
PRESS-BUTTON ASSEMBLY FOR CONTROLS ON ACCOMP. SECTION (DWG9)			
P-788	Complete with Components		978002367

MODEL 915

ELECTRONIC COMPONENT LIST

Schem. Ref.	Circuit	Type	Part Code
VOL. REVERB - VOL. CHORUS - VOL. TEMPO RHYTHMS - VOL. PIANO BASS (DWG9)			
P-761	Complete with Components		978002338
ACCOMPANIMENT SECTION (LOGIC) (DWG10)			
P-752	Complete with Components		978002325
IC1-IC2-IC5			
IC6	Modulator (V.C.A.)	3080	68000066
IC7	Cymbal filter	741	68000059
IC3-IC4-IC8	Preamplifier	1458	68000107
TR1	Bass Drum Generation	BC209	62120001
TR2	Bongo Low Generation	BC209	62120001
TR3	Bongo High Generation	BC209	62120001
TR4	Claves Generation	BC209	62120001
TR6-8-9-10	Cow Bell Oscillator	BC209	62120001
TR5	Cow Bell Oscillator	BC204	62210001
TR7	Cow Bell Oscillator	BC204	62210001
TR11-12	Cow Bell Gate	BC204	62210001
TR13-14	Cow Bell Preamplifier	BC204	62210001
TR16	Preamplifier	BC209	62120001
TR20	Preamplifier	BC204	62210001
TR17	Cymbalsh. Envelope	BC209	62120001
TR22	Envelope	BC209	62120001
TR21	Envelope	BC209	62120001
TR18	Cymbal Long Envelope	BC209	62120001
TR19	Snare Generation	BC209	62120001
TR15	Noise	SFT714	62210002
TR23	Switch	BC173C	62120003
D1 ÷ D13	Diodes	BA130	65000001
DZ1	Diode Zener	ZPY12V	67000010
VOL. REVERB - VOL. VIB. CHORUS - VOL. TEMPO RHYTHMS - VOL. PIANO BASS (DWG10)			
P-761	Complete with Components		978002338
PRESS-BUTTON ASSEMBLY - FOR CONTROLS ON ACCOMPANIMENT SECTION (DWG10)			
P-788	Complete with Components		978002367

MODEL 915

ELECTRONIC COMPONENT LIST

Schem. Ref.	Circuit	Type	Part Code
POWER-SUPPLY FILTERS (DWG10)			
P-753	Complete with Components		978002326
TR1	Lamp Current Regulator	BC287	62110003
AMPLIFIER (DWG10)			
P-754	Complete with Components		978002327
TR1	Unit Amplifier	BC327	62110007
TR2	Unit Amplifier	L01	62110004
TR3	Unit Amplifier	BC287	62110003
TR4	Unit Amplifier	BC286	62110002
REVERB (DWG10)			
P-755	Complete with Components		978002328
IC1	Driver And Amplifier	1458	68000107
POWER SUPPLY (DWG10)			
P-763	Complete with Components		978002341
IC1	Voltage Regulator	7815	62110020
IC2	Voltage Regulator	7915	62110022
PD1 ÷ PD3	Rectifier Bridge	KBL04	66000006

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